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Scope of Work for the Remedial Design and Remedial Action at the G&H Industrial Landfill Site, Macomb County, Michigan.

I. PURPOSE

The purpose of the Scope of Work is to implement the G&H Industrial Landfill Site (the "Site") Record of Decision ("ROD"), which the United States Environmental Protection Agency ("EPA") issued in December, 1990 to select the remedial action for the Site. EPA Superfund Remedial Design and Remedial Action Guidance; the Record of Decision, as modified by an ESD or as amended pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499 ("CERCLA"); the approved Remedial Design and Remedial Action ("RD/RA") Work Plan; any additional guidance document(s) provided by EPA; and the provisions of the Consent Decree and this Scope of Work ("SOW") shall be followed in designing and implementing the remedial action at the Site.

II. DESCRIPTION OF THE REMEDIAL ACTION

Settling Defendants shall achieve the following standards and specifications of the major components of the remedial action for the Site:

A. Landfill Cap

Settling Defendants shall design, construct, and maintain a landfill cover ("cap") that meets or exceeds the requirements of Michigan State Hazardous Waste Rules 299.9619 and RCRA Subtitle C (landfill closure under 40 C.F.R. Section 264.310) as enforced by Michigan Act 64. At a minimum, the cap shall be a multilayer cap as described below (from top to bottom):

1. A vegetative topsoil layer which is a minimum 6 inches thick that will sustain plant growth (e.g., prairie grass) and will control erosion and promote drainage;
2. A common fill soil layer which is a minimum 2.0 feet thick, unless EPA, in consultation with MDNR, determines that a lesser amount of common fill soil would maintain the hydraulic conductivity of the entire clay layer at 1×10^{-7} centimeters per second ("cm/s") in which case a minimum of 1.0 foot of common fill soil may be utilized;
3. A sand/gravel drainage layer which is a minimum 1.0 foot thick that will minimize precipitation infiltration into the low permeability layer. The sand/gravel drainage layer shall have a minimum hydraulic conductivity of 1×10^3 cm/s;

4. A low permeability, compacted clay layer that minimizes precipitation infiltration into the landfill. The clay layer shall be a minimum 3.0 feet thick and have a maximum hydraulic conductivity of 1×10^{-7} cm/s; and
5. A gas venting system capable of removing methane gas build-up beneath the cover, and installed in a manner which does not increase the hydraulic conductivity of the cap above 1×10^{-7} cm/s. Gas venting shall comply with the substantive requirements of an air quality permit under Michigan Act 348, as approved by EPA, in consultation with MDNR.

Settling Defendants shall install the cap over the landfill areas as designated in Figure 1. Sufficient fill material shall be placed under the cap to bring the landfill areas up to the correct grades (minimum of 2%), as shown in Figure 2. Fill material may be comprised of excavated soils or sediments from the polychlorinated biphenyls ("PCBs") area of concern (see Section II.D, below); excavated soils, if any, from the automobile disposal yard (see Section II.C, below); clean soils; non-hazardous demolition rubble; fill from the wetlands replacement area; and clean construction-site soils. Settling Defendants shall demolish existing structures on the landfill property along 23-Mile Road by July 15, 1992.

No multilayer cap shall be placed over the Detroit Water and Sewerage Department ("DWSD") easement as shown in Figure 1 unless EPA, in consultation with MDNR, determines that it is necessary from an engineering perspective for the maintenance of the correct grade. Should the DWSD need to excavate in the easement for any reason, Settling Defendants shall be responsible for the subsequent repair of cap damage. Settling Defendants shall contact the DWSD and arrange for a formal agreement regarding access, cap placement, and excavation and repair procedures. Settling Defendants shall submit a copy of the formal arrangement to EPA within 15 days of its execution. If the EPA, in consultation with MDNR, determines that it is necessary to place fill in the easement area, then Settling Defendants shall place clean fill in that area.

Earthen berms and/or plant materials (i.e., trees or shrubs) shall be placed around the landfill area perimeter to control dust and noise impacts. Other adequate noise and dust suppressant measures shall be taken to protect the community from the effects of construction.

After construction of the cap, the vegetative, drainage, and clay layers shall be maintained by Settling Defendants. Maintenance concerning the cap shall include grass maintenance, regular inspections, flushing drainage lines, and repair of damaged areas, including frost damage, in accordance with the requirements of the Operations and Maintenance Plan (see Section III, Task 2, below).

B. Source Containment System

Settling Defendants shall design, construct, and operate and maintain a source containment system which shall hydraulically and physically isolate the Phase I, II, and III landfill areas, the oil seep area, and, if necessary as determined under Section II.C. of this SOW, the automobile disposal yard. The source containment system shall prevent the further migration of hazardous substances, pollutants, and contaminants from the Site and assure that groundwater outside of the source containment system at the Site shall achieve each of the Cleanup Standards set forth in Table 1 (see Section II.E., below) at the conclusion of the Work¹.

Settling Defendants shall construct the source containment system comprised of one of the following components:

- 1a. A gravel-filled groundwater collection trench which shall be constructed with a minimum of six collection sumps; perforated collection tile; a series of piezometers upgradient of the trench; and a downgradient barrier consisting of either a minimum 2.0 foot thick slurry wall with a maximum hydraulic conductivity of 1×10^{-7} cm/s or a Flexible Membrane Liner (FML) as approved by EPA, in consultation with MDNR. The downgradient barrier shall be keyed into the lacustrine/till unit beneath the Site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit; or
- 1b. A subsurface vertical barrier wall ("slurry wall") which shall be constructed along the southern perimeter of the Phase I and II landfill areas, and the oil seep area. The slurry wall shall be a minimum 2.0 feet thick and have a maximum hydraulic conductivity of 1×10^{-7} cm/s. The slurry wall shall be keyed into the lacustrine/till unit beneath the Site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit;

Implementation of either the groundwater collection trench or the slurry wall shall be subject to approval by EPA, in consultation with MDNR.

In addition to component 1a or 1b above, Settling Defendants shall construct the source containment system with each of the following components:

2. A minimum of one extraction well located in the DWSD easement to prevent any length of the watermain from being in contact with

¹As used in this SOW, the term "Work" shall have the same meaning as in Section IV of the Consent Decree.

the groundwater table and to intercept landfill contaminants which may migrate in the bedding material for the watermain;

3. A subsurface vertical barrier wall (slurry wall) located along the southeast side of the Phase I landfill area to prevent migration of contaminants from the landfill. The slurry wall shall be keyed into the lacustrine/till unit beneath the Site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit. The lateral extent of the slurry wall may be modified as required in Section II.C., below; and
4. A leachate collection toe drain located on the western side of the Phase III landfill area.

Figure 3a indicates the alignment of the groundwater collection trench, the downgradient barrier (i.e., slurry wall or FML), the toe drain, and the location of the DWSD extraction well. Figure 3b indicates the alignment of the slurry wall and the toe drain, and the location of the DWSD extraction well.

Groundwater and leachate intercepted by the source containment system shall be pumped to the treatment system (see Section II.E, below) for removal of chemicals to the extent necessary to satisfy water discharge criteria as required in Sections II.E.3 and II.E.4, below.

Settling Defendants shall construct the source containment system comprising of one of the following components:

1a. Groundwater Collection Trench

Settling Defendants shall install the groundwater collection trench by excavating to the top of the lacustrine clay/till unit along the alignment shown in Figure 3a. Perforated collection tile shall be placed at the base of the trench and the tile shall be surrounded by clean, coarse gravel backfill. The remainder of the trench also shall be backfilled with clean, coarse gravel. The upgradient side of the trench shall be designed so that the trench width, the size and gradation of gravel, and any other construction materials will prevent siltation of the gravel.

Settling Defendants shall construct a minimum 2.0 foot thick barrier (slurry wall) with a maximum hydraulic conductivity of 1×10^{-7} cm/s, or an FML, downgradient of the trench ("downgradient barrier") to prevent the dewatering of the aquifer and wetlands area to the south of the trench alignment. The downgradient barrier shall be keyed into the lacustrine/till unit beneath the Site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit. Material with a lower permeability than the gravel backfill (e.g., clay or silt) shall be used to backfill the surface of the trench to reduce surface run-

off infiltration into the trench and also to reduce air emissions from the trench.

Settling Defendants shall install a minimum of six collection sumps to remove collected water to provide an inward 2.0-foot hydraulic gradient across the trench (i.e., the hydraulic head of the water table outside of the downgradient barrier shall be a minimum 2.0 feet higher than the hydraulic head of the water table on the inside of the downgradient barrier). At a minimum, groundwater shall be removed from the collection trench to produce hydraulic containment of the Site in the area shown in Figure 4a. Hydraulic containment is defined as the condition where the upper aquifer groundwater gradients cause flow towards the groundwater collection trench from the areas of the Site designated in Figure 4a. Settling Defendants shall install piezometers upgradient of the source containment system. Settling Defendants shall monitor the piezometers every 2 months, at a minimum, to demonstrate that water removal has achieved hydraulic containment. If water level measurements demonstrate that hydraulic containment is not occurring, then pumping rates shall be increased as necessary to accomplish hydraulic containment (see Section II.B.7, below).

Settling Defendants shall remove collected water from the trench by pumping the six sumps. The sumps shall be installed in such a manner as to ensure that a blockage in the system shall not isolate any part of the system and cause any part of the system to be inoperable. Should blockage occur, repair shall proceed as set forth in Section II.B.7, below. Settling Defendants shall provide a backup power source to ensure that the source containment system shall operate during power outages.

Settling Defendants shall design, construct, operate and maintain the groundwater collection trench to collect and remove nonaqueous or separate phase products (e.g., oil, paints, solvents) derived from the Site. The collected separate phase products shall be properly removed for treatment off-site in accordance with the Resource Conservation and Recovery Act of 1980 (RCRA), 42 U.S.C. §6901 *et seq.*, and PCB-specific requirements of the Toxic Substances Control Act (TSCA), 15 U.S.C. §2601, *et seq.* The downgradient barrier shall be compatible with any separate phase products to provide a barrier to migration while removal of the separate phase products is on-going.

1b. Slurry Wall

Settling Defendants shall design, construct, and maintain a subsurface vertical barrier wall ("slurry wall") along the southern perimeter of the Phase I and II landfill areas and the oil seep area, as designated in Figure 3b. The slurry wall shall be a minimum 2.0 feet thick and have a maximum hydraulic conductivity of 1×10^{-7} cm/s. The slurry wall shall be keyed into the lacustrine-

till unit beneath the Site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit.

Settling Defendants shall design, construct, operate and maintain a groundwater gradient control network to provide an inward 2.0-foot hydraulic gradient across the slurry wall (i.e., the hydraulic head of the water table outside of the slurry wall shall be a minimum 2.0 feet higher than the hydraulic head of the water table on the inside of the slurry wall). At a minimum, groundwater shall be removed from the landfill area to produce hydraulic containment of the Site in the area shown in Figure 4b. Hydraulic containment is defined as the condition where the upper aquifer groundwater gradients cause flow towards the slurry wall from the areas of the Site designated in Figure 4b. Settling Defendants shall install piezometers upgradient of the source containment system. Settling Defendants shall monitor the piezometers every 2 months, at a minimum, to demonstrate that water removal has achieved hydraulic containment. If water level measurements demonstrate that hydraulic containment is not occurring, Settling Defendants shall increase pumping rates as necessary to accomplish hydraulic containment (see also Section II.B.7, below). Settling Defendants shall design the extraction well system so that pumping rates of individual pumps may be adjusted should maintenance be required on adjacent pump(s).

Settling Defendants shall treat contaminated groundwater that is extracted to meet National Pollutant Discharge Elimination System ("NPDES") criteria, as described in Sections II.E.3 and E.4, below, prior to its discharge to the wetlands or the Clinton River; or if discharge is made to the DWSJ treatment system, pretreatment requirements must be met. The estimated extraction well placement is shown in Figure 3b. The final extraction well network will be determined after the slurry wall and landfill cover have been installed. The final determination shall be based upon Site conditions such as the local geology or debris at the designated well points in Figure 3b and the amounts of water that must be removed to maintain the 2-foot head differential. Water treatment residuals shall be handled as described in Sections II.E.3 and II.J, below.

Maintenance of the slurry wall may entail the extraction of oil from the Phase I landfill area (Figure 3b) to prevent the adverse effects that the oil may have on the slurry wall materials. Settling Defendants shall design and, upon EPA approval, shall implement, compatibility testing of the slurry wall construction materials with chemical compounds associated with the landfill. Compatibility testing shall evaluate the effects of varied concentrations of typical landfill contaminants (e.g., oil), up to the maximum concentrations noted in the RI report, on the effectiveness of the slurry wall construction materials. Test results shall be submitted to EPA for review. If EPA, in consultation with MDNR, determines that high concentrations of

hazardous substances are likely to increase the hydraulic conductivity of the slurry wall to greater than 1×10^{-7} cm/s, then Settling Defendants shall utilize oil/water extraction wells to prevent the migration of oil and solvents towards the slurry wall. Extracted oil/water shall be treated as in Section II.E.3, below.

In addition to component 1a or 1b, above, the source containment system constructed by Settling Defendants shall include each of the following components:

2. Extraction Well in DWSD Easement

A minimum of one extraction well(s) shall be located in the DWSD easement upgradient of the collection trench (1a) or slurry wall (1b). The well(s) shall be operated and maintained to continuously prevent the groundwater table or landfill contaminants from contacting the watermain.

3. Slurry Wall

Settling Defendants shall design, construct, and maintain a slurry wall along the southeast perimeter of the Phase I landfill area as shown in Figure 3a or 3b. The slurry wall shall be a minimum of 2.0 feet thick and have a maximum hydraulic conductivity of 1×10^{-7} cm/s. The slurry wall shall be keyed into the lacustrine/till unit beneath the site, with a minimum of 3.0 feet of the slurry wall to be constructed into the lacustrine/till unit. The slurry wall shall be connected to the downgradient barrier.

Maintenance of the slurry wall may entail the extraction of separate phase products from the Phase I landfill area to prevent the products from increasing the hydraulic conductivity of the slurry wall to greater than 1×10^{-7} cm/s. Settling Defendants shall design and, upon EPA approval, implement compatibility testing of the slurry wall construction materials with chemical compounds associated with the landfill. Testing shall evaluate the effects of concentrations of the landfill contaminants (e.g., oil) noted in the RI report (Table 3-3), on the effectiveness of the slurry wall construction materials. Compatibility test results shall be submitted to EPA for review. If EPA, in consultation with MDNR, determines that high concentrations of hazardous substances are likely to increase the hydraulic conductivity of the slurry wall to greater than 1×10^{-7} cm/s, then Settling Defendants shall utilize oil/water extraction wells to prevent the migration of oil and solvents towards the slurry wall. Extracted oil/water shall be treated as in Section II.E.3, below.

4. Leachate Collection Drain

Settling Defendants shall design, construct, operate, and maintain a leachate collection toe drain along the west side of the Phase

III landfill area. The leachate collection drain shall be located as shown in Figure 3a or 3b.

The leachate collection drain shall consist of a 6-inch diameter perforated PVC pipe with 4-inch perforated PVC pipe lateral connections which shall extend upward into the bank of waste. The perforated pipe shall be wrapped in filter cloth to prevent plugging of the perforations and shall be installed in trenches which shall be backfilled with coarse granular material to provide additional drainage.

The system shall drain via gravity flow to a collection sump located southwest of the Phase III landfill area. A sump pump shall be used to transfer the collected leachate via forcemain to the on-site treatment plant (see Section II.E, below). A back-up power source shall be installed in case of general power failure.

5. Operational Time Period

Settling Defendants shall continuously operate and maintain each component of the source containment system.

6. Demonstration of Performance

Within 60 days after start-up of the sumps, Settling Defendants shall demonstrate that the source containment system is meeting the performance criteria identified in the approved Final RD/RA Design document.

7. Correction of Deficiencies

Should groundwater level measurements show that the source containment system is not maintaining hydraulic and/or physical containment of the Site, EPA, in consultation with MDNR, shall request Settling Defendants to provide a plan for corrective action. Settling Defendants, within 20 days of receipt of the request, shall submit a corrective action plan to EPA for review and approval. The corrective action plan shall include a schedule for any investigative or construction work necessary to correct any deficiencies noted. If EPA does not approve the corrective action plan, EPA shall provide comments to Settling Defendants who shall resubmit the plan within 10 days of receipt of comments. Upon approval of the corrective action plan, Settling Defendants shall implement the plan in accordance with the schedule set forth in the approved plan.

C. Junkyard

Settling Defendants shall design and implement a soil sampling and analysis program for the automobile disposal yard ("junkyard") located at 23-Mile and Ryan Roads (see Figure 5). The information gathered shall be used during the design of the landfill cap to

determine if the soil and any remaining surface debris at the junkyard are contaminated.

The sampling and analysis program for the junkyard shall include, but not be limited to, the delineation of the extent of the landfill into the junkyard and sampling and analysis of soil to determine whether or not unacceptable risks may be posed. A minimum of 15 locations shall be sampled and analyzed to optimize any required treatment and/or disposal operations and systems. Settling Defendants shall submit to EPA and MDNR a Junkyard Sampling Plan ("JSP") for the junkyard soil sampling and analysis program by July 15, 1992. Settling Defendants shall complete the sampling of the junkyard area within 60 days of EPA's approval of the JSP.

Settling Defendants shall submit all information gathered to EPA during the preliminary (30%) design submittal. EPA shall determine, in consultation with MDNR, whether conditions warrant either no action, or the removal and/or the capping of the surface soils and debris at the junkyard. EPA shall consider, but not be limited to, the following factors to determine whether the soil and debris shall be removed or capped:

- a. Contaminant types and concentrations present in the soil and surface debris;
- b. Volume of affected soil and debris;
- c. Short-term impacts of excavation of the soil and debris on site workers and the community; and
- d. If greater than a 1×10^{-4} excess cancer risk and/or greater than a 1.0 Hazard Index exists under standard risk assessment scenarios.

If EPA, in consultation with MDNR, determines that the soil and remaining surface debris in the junkyard are contaminated and that excavation may pose unacceptable short-term risks to site workers or to the community, then Settling Defendants shall design and construct a cap for the junkyard soils in accordance with the specifications in Section II.A, above. In addition, EPA, in consultation with MDNR, shall require the source containment system (Section II.B, above) to hydraulically and physically contain the junkyard area if EPA, in consultation with MDNR, determines that oil-saturated soil/debris extends into the junkyard portion of the property.

Settling Defendants shall design and implement the soil and debris remediation program in the junkyard upon EPA's determination, in consultation with MDNR, of the appropriate surface soil and debris remediation program. Cleanup standards to be applied to the

contaminant levels found shall be determined under Michigan Act 307, Type B criteria if the soil is to be excavated and consolidated under the landfill cap. Michigan Act 307, Type C criteria shall apply if it is determined that the junkyard area shall be hydraulically and physically contained and/or capped.

D. PCBs in Soils/Sediments

Settling Defendants shall design and implement a soil/sediment sampling program to fully delineate where soils and sediments at the Site, projected to be located outside of the areas to be capped, contain 1 mg/kg (ppm) or greater PCBs. Those soils and sediments containing 1 ppm or greater PCBs and which are potentially located outside of the areas to be capped shall be fully identified for excavation and removal. The areas to be sampled are shown in Figure 6. Once the complete areas containing PCBs at 1 ppm or greater are determined by EPA, in consultation with MDNR, Settling Defendants shall design and implement a soil/sediment removal program at the Site, subject to the approval of EPA, in consultation with MDNR.

Soils/sediments containing 500 ppm PCBs or greater shall be excavated and treated as determined in Section III.K.6 of the ROD (page 44). Soils/sediments containing less than 500 ppm PCBs shall be consolidated under the Phase I landfill area cap. Excavations shall be refilled with clean soil.

E. Installation and Operation of a Groundwater Extraction, Collection, Treatment, and Discharge System

Settling Defendants shall design, construct, operate, maintain, and modify, as approved by EPA, an on-site groundwater extraction, collection, treatment, and discharge system ("groundwater extraction system") in a manner to capture, draw back, and remove the groundwater contaminant plume ("plume") located outside of the source containment system (see Figure 3). The groundwater extraction system shall prevent the further migration of hazardous substances, pollutants and contaminants in groundwater from the Site and assure that groundwater outside of the source containment system shall achieve each of the Cleanup Standards set forth in Table 1 at the conclusion of the Work.

The groundwater extraction system well network shall utilize a minimum of 20 extraction wells (see Figure 7 for approximate well locations) to achieve the groundwater Cleanup Standards, unless EPA determines, in its unreviewable discretion, that fewer extraction wells will achieve the cleanup objectives.

Settling Defendants shall perform a pump test prior to the design of the groundwater extraction system network to assist EPA, in consultation with MDNR, to determine the optimum pumping rate to extract the plume; however, at a minimum, the extraction wells

shall pump a total of 30 gallons per minute. Extraction wells also shall be pump tested during the installation phase to refine the design as required to capture and draw back the plume. Settling Defendants shall install piezometers downgradient of the extraction wells to verify that the capture zone(s) are as required to capture and draw back the plume and to prevent the further migration of contaminants from the Site.

The collection and distribution system shall be used to transport extracted groundwater to the treatment system for chemical removal (see Section II.E.3, below). The groundwater extraction system shall be designed to operate year-round.

EPA may require that the groundwater extraction system be modified in order to achieve the groundwater Cleanup Standards as follows:

- (a) Pumping may be discontinued at individual wells where groundwater Cleanup Standards have been attained;
- (b) Wells may be pumped on an alternate basis to eliminate stagnation points;
- (c) "Pulse pumping" may be performed to allow the aquifer to equilibrate and allow adsorbed contaminants to partition into the groundwater for extraction; and
- (d) Additional extraction wells may be installed to facilitate or accelerate cleanup of the contaminant plume.

1. Groundwater Cleanup Standards

The concentrations of any hazardous substances, pollutants and contaminants remaining in the upper aquifer located outside of the source containment system, at the time of issuance of the Certification of Completion of the Remedial Action pursuant to Section XXVII of the Consent Decree, shall not exceed any of the concentrations of hazardous substances, pollutants or contaminants in groundwater set forth in Table 1, subject to Section VI, Paragraph 11.b. of the Consent Decree ("Technical Impracticability") and Section II.G.5 ("Additional Information") of this SOW. The Cleanup Standards established in Table 1, subject to Section VI, Paragraph 11.b. of the Consent Decree and Section II.G.5 of this SOW, shall be achieved, and thereafter continuously maintained, at each of the extraction and monitor wells located outside of the source containment system at the Site.

Table 1
Groundwater Cleanup Standards
G&H Industrial Landfill

<u>Compound</u>	<u>Standard</u>
Benzene	1.0 ppb
Xylene	20 ppb
Ethylbenzene	30 ppb
Arsenic	0.02 ppb*
Lead	5 ppb*
Trichloroethene	3 ppb
Tetrachloroethene	1.0 ppb
cis-1,2-Dichloroethene	1.0 ppb
trans-1,2-Dichloroethene	100 ppb
Vinyl chloride	1.0 ppb
1,1-Dichloroethane	1.0 ppb

*Naturally occurring (background) levels found at the site may be higher than the Cleanup Standard. In that event, background levels will become the Cleanup Standard.

2. Determination of Residual Risks

The following procedures shall be used to determine residual risks in any petitions submitted to EPA:

a. Determination of Groundwater Risks for Substances with Possible Carcinogenic Effects.

Settling Defendants shall calculate the excess lifetime carcinogenic risk associated with exposure to a hazardous substance, pollutant or contaminant that has been identified by EPA's Cancer Assessment Group as a possible, probable or known human carcinogen. Individual substance carcinogenic risk levels shall be calculated for each extraction and monitor well screened in the upper aquifer outside of the source containment system, in accordance with the Risk Assessment Guidance for Superfund Manual (December, 1989) or any successor document, or revisions thereto, in effect at the time the calculations are performed. The toxicity data used in preparing the calculations for each substance shall be the most current data contained in such Manual or available from EPA's Cancer Assessment Group with respect to that substance. All risk calculations shall reflect risks associated with ingestion-, dermal absorption-, and inhalation-specific exposure routes considered significant for groundwater and shall be based on the same exposure scenarios used in EPA's Remedial Investigation Public

Health Evaluation for the Site. Calculations shall be submitted to EPA for review and approval.

b. Determination of Groundwater Toxic Effects for Substances Not Believed to be Carcinogens.

Settling Defendants shall calculate the chronic Hazard Index associated with exposure to a hazardous substance, pollutant, or contaminant that has not been identified by EPA's Cancer Assessment Group as a possible, probable or known human carcinogen. The chronic Hazard Index shall be calculated for the groundwater at each extraction and monitor well screened in the upper aquifer outside of the source containment system. The chronic Hazard Index shall be calculated in accordance with the Risk Assessment Guidance for Superfund Manual (December, 1989) or any successor document, or revisions thereto, in effect at the time the calculations are performed and any other applicable EPA guidance. The toxicity data used in preparing the Hazard Index calculations for each substance shall be the most current data contained in such Manual or in other guidance issued by EPA. All Hazard Index calculations shall reflect risks associated with ingestion-, dermal absorption-, and inhalation-specific exposure routes considered significant for groundwater ingestion, dermal absorption, and inhalation of contaminants and shall be based on the same exposure scenarios used in EPA's Remedial Investigation Public Health Evaluation for the Site.

3. Treatment

Extracted groundwater shall be pumped to the treatment system for removal of chemical contaminants to the extent necessary to satisfy (a) NPDES discharge criteria prior to discharge of the treated water to the wetlands or the Clinton River; or (b) pretreatment requirements for discharge to the DWSD treatment system. The groundwater treatment process shall be capable of treating a minimum of 100 gallons per minute ("GPM") and shall include at least the following steps: oil and water separation, metals removal (e.g., precipitation, clarification, and filtration), and organic chemical removal (aeration and carbon polishing). Treatability testing shall be performed to determine the design parameters of the treatment system in order to meet direct discharge or pretreatment requirements. Emissions from the air stripper shall meet the substantive requirements of a Michigan Act 348 air permit.

All treatment process residuals shall be handled in accordance with all applicable or relevant and appropriate requirements pertaining to the Site. Spent carbon from water and/or air treatment systems shall be handled as a RCRA waste and either disposed of in a RCRA-compliant facility in accordance with Land Disposal Restrictions or regenerated off-site (see Section II.J, below). Recovered oils

shall be thermally destroyed off-site in a RCRA-compliant and, if the oil contains PCBs, TSCA-compliant facility.

The treatment system shall be located as close to the landfilled area of the Site as practicable and shall be situated to minimize interference with the reopening of the Rochester-Utica State Recreational Area.

4. Discharge

Any discharges to the wetlands or the Clinton River, or alternatively to the DWSD treatment plant, shall comply with all effluent limitations, monitoring requirements, reporting requirements, and other substantive requirements approved by EPA, in consultation with MDNR, including all such discharges from the treatment system or from the pump testing performed prior to the installation of the treatment system. The effluent limitations shall be consistent with all substantive requirements of the Clean Water Act, 33 U.S.C. §1251 et seq., including the application of best available technology economically achievable within the meaning of section 301(b)(2)(A) of the Clean Water Act, 33 U.S.C. §1311(b)(2)(A), as well as any more stringent effluent limitations necessary to meet (1) water quality standards established pursuant to Part 21 of Michigan Act 245 and the Clean Water Act, 33 U.S.C. §1251 et seq., prior to discharge of the treated water to the wetlands or the Clinton River (such standards established pursuant to the NPDES permit program) or, alternatively, (2) pretreatment requirements for discharge to the DWSD treatment plant (such pretreatment requirements to be established by DWSD).

EPA, in consultation with MDNR, may issue an "authorization to discharge" which shall include effluent limits conforming to criteria set forth within this section; discharge monitoring requirements; and all other substantive terms and conditions of an NPDES permit.

No permit shall be required of Settling Defendants to discharge the treated water to the wetlands or the Clinton River, as the discharge of the water shall be considered to be on-site pursuant to the provisions of 42 U.S.C. §9621(e)(1). For any on-site discharge to the DWSD sewerline, Settling Defendants shall meet the substantive requirements of any pretreatment permit necessary to discharge to a DWSD wastewater treatment plant. Discharge of water to a DWSD treatment plant may be considered to be off-site (depending on the location of the discharge point) and would then be discharged in accordance with the requirements set forth in any pretreatment permit issued by the City of Detroit or the State of Michigan.

a. Discharge Monitoring and Reporting Requirements for the Wetlands or the Clinton River

Compliance with any effluent limitations set forth in the NPDES requirements or authorization to discharge, and as established pursuant to Section II.E.4 of this SOW, shall be determined by analysis of samples of treated groundwater collected at the point of discharge to the wetlands or the Clinton River. Settling Defendants shall collect, analyze and report the results of all such samples in accordance with requirements set forth in the authorization to discharge referred to above and in the approved Operations & Maintenance ("O&M") Plan referred to in Section III of the SOW.

b. Discharge Monitoring and Reporting Requirements for the DWSD POTW

Compliance with any pretreatment requirements, as determined by the DWSD and as established above, shall be determined by sampling and analysis of treated groundwater at the point such groundwater is introduced into the sanitary sewer. Settling Defendants shall collect, analyze and report the results of all such samples in accordance with requirements set forth in any applicable permit that may be required and issued by the DWSD.

5. Operational Time Period: Cease Operations Petition

Settling Defendants shall continuously operate the groundwater extraction system until a petition to cease operation of such system is approved by EPA, in consultation with MDNR. Any petition to cease operation of the groundwater extraction system shall include documentation conforming to the requirements of this SOW showing that the groundwater Cleanup Standards have been continuously achieved for at least 24 months. During this 24-month period, Settling Defendants shall collect and analyze groundwater samples on a quarterly basis from all extraction and monitor wells (i.e., at least 8 samples from each compliance point). Samples collected during the Second, Third, Fourth, Fifth, Sixth, and Seventh sampling events during this 24-month period shall be analyzed for each of the contaminants listed in Table 1. All other groundwater samples (i.e., the First and Eighth sampling events) collected during the 24-month period shall be analyzed for the hazardous substances, pollutants, and contaminants on the Hazardous Substances List approved by EPA in the QAPP.

All petitions to cease operation of the groundwater extraction system shall also include: (i) results of analyses of all groundwater samples collected during the 24-month period from each extraction and monitor well, and (ii) all individual substance and cumulative carcinogenic risk determinations and Hazard Index calculations performed in accordance with the provisions of Sections II.E.2.a and II.E.2.b, above. Settling Defendants shall

demonstrate to EPA and MDNR that there shall be no likelihood that further landfill contamination of groundwater outside of the source containment system will cause the contaminant levels to exceed the groundwater Cleanup Standards listed in Table 1 once the extraction system is shut down.

6. Correction of Deficiencies/Adverse Hydrologic Consequences

If the groundwater monitoring program indicates that insufficient water is being withdrawn by the extraction system so that groundwater contaminant concentrations in the leading edge of the plume are not decreasing or that groundwater contaminant concentrations are not decreasing at the rate necessary to achieve Cleanup Standards within 30 years, EPA, in consultation with MDNR, may notify Settling Defendants of the deficiency. Upon notice of a deficiency, Settling Defendants shall provide to EPA, within 30 days of the notice, a plan for corrective action. If EPA disapproves all or a portion of the plan, Settling Defendants shall submit a revised corrective action plan to EPA within 10 business days of notification by EPA of disapproval of the plan and receipt of comments. Upon EPA approval of the corrective action plan, Settling Defendants shall implement the plan in accordance with the timetable in the approved plan.

In the event that during operation of the groundwater extraction system adverse hydrologic consequences occur (such as lowering the water table enough to impact drinking water wells), Settling Defendants shall immediately notify EPA of such occurrence. To the extent that such occurrence causes or threatens a release of a hazardous substance into the environment which presents or may present an imminent and substantial endangerment to public health or welfare or the environment, Settling Defendants shall immediately take all appropriate action as required under Section XXIV of the Consent Decree. Within 30 days of notice to EPA of an adverse hydrologic consequence, Settling Defendants shall submit a plan for corrective action, in writing, to EPA. If EPA disapproves all, or a portion of the plan, Settling Defendants shall submit a revised corrective action plan to EPA within 10 business days of notification by EPA of disapproval of the plan. Upon EPA approval of the corrective action plan, Settling Defendants shall implement the plan in accordance with the timetable in the approved plan.

Should a drinking water well be affected, Settling Defendants shall take corrective action as soon as possible, but no later than 7 days after Settling Defendants receive constructive notice of this adverse hydrologic consequences.

7. Post Shutdown Monitoring

After discontinuing operation of the groundwater extraction system, Settling Defendants shall perform monitoring of groundwater, in accordance with provisions of the approved Operations and

Maintenance Plan, to document the concentrations of hazardous substances, pollutants and contaminants in such groundwater outside of the source containment system at the Site. Such monitoring shall continue until Settling Defendants demonstrate that the Cleanup Standards have been continuously satisfied for thirty (30) years following final shutdown of the groundwater extraction system.

8. Restart

If groundwater monitoring, as set forth under Section II.E.7, above, indicates that the concentration of any hazardous substance, pollutant, or contaminant increased above the groundwater Cleanup Standards after groundwater extraction and treatment has been terminated, in accordance with Section II.E.5, above, Settling Defendants shall notify EPA and resample the offending monitor well(s) within 15 days of obtaining the data. Should the second sample exceed a groundwater Cleanup Standard in Table 1, Settling Defendants shall sample the offending monitor well(s) once a month for three additional months (for a total of five monthly samples). Should each of these samples exceed any of the groundwater Cleanup Standards in Table 1, Settling Defendants shall reactivate the groundwater extraction system. Settling Defendants shall thereafter operate and maintain the groundwater extraction system until Settling Defendants again demonstrate compliance with the groundwater Cleanup Standards as provided in Section II.E.5, above.

EPA will not require restart to be triggered should one of the five consecutive monthly samples meet groundwater Cleanup Standards. Settling Defendants may reactivate the groundwater extraction system if approved by EPA. However, the monthly sampling shall not cease until four consecutive samples do not exceed groundwater Cleanup Standards.

F. Fence Installation

Upon completion of remedial action construction, Settling Defendants shall install a fence around the designated portions of the Site (see Figure 8) to reduce risks which may be imposed on public health due to exposure to hazardous substances, pollutants, and contaminants at the Site and also to protect the cap and treatment equipment from vandalism. The fence shall consist of six-foot high chain link with three-strand barbed wire. The fence shall enclose areas of remedial construction at the Site (see Figure 8) (i.e., groundwater treatment system components, source containment system, cap, and, if necessary, the junkyard) and shall be equipped with a minimum of one swing gate. Standard Superfund warning signs shall be posted at 200-foot intervals along the fence and on the gate(s). Portions of the current fence may be utilized as practicable to achieve this requirement.

The current fence shall be maintained to protect the public from risk due to construction activity or exposure to hazardous chemicals at the Site during the cleanup process.

Once the PCB soils and sediment removal is complete, in accordance with Section II.D, above, the current fence shall be removed from the Rochester-Utica Recreational Area, to the maximum practicable extent as determined by EPA, in consultation with MDNR, to facilitate the reopening of the State lands.

G. Groundwater, Surface Water, and Sediment Monitoring Program

Settling Defendants shall design, for EPA approval, in consultation with MDNR, and implement a groundwater monitoring program designed to detect changes in the chemical concentration of the groundwater at the Site. The groundwater monitoring program shall include collection and field and laboratory analysis of samples from the monitor wells (Figure 9) located at the Site. In addition, samples shall be taken from the surface waters and sediments in the areas designated in Figure 10 until the PCB excavation program is completed (see Section II.D, above). The samples shall be used to monitor chemical concentrations in the sediments and surface waters to detect adverse conditions (if any) caused by the Site in the Rochester-Utica Recreational Area, the wetlands, the Clinton-Kalamazoo Canal, and the Clinton River.

1. Groundwater: Additional Wells/Monitoring Locations

Settling Defendants shall collect and analyze groundwater samples from each of the existing monitor wells shown in Figure 9. Additional monitor wells shall be installed, as shown in Figure 9, to facilitate the monitoring requirements below. As shown in Figure 9, four additional monitor wells shall be screened in the upper portion of the aquifer (0-10 feet below the water table) and four additional monitor wells shall be screened in the lower portion of the aquifer (15-25 feet below the water table).

2. Surface Water and Sediment: Sampling Locations

Until the source containment system and cap are installed and the PCB excavation task is completed, Settling Defendants shall sample and analyze surface waters and sediments in the woodlands and wetlands south and west of the landfill areas, and in the Clinton River, as designated in Figure 10.

3. Sampling Frequency

(a) Groundwater

After the Consent Decree has been lodged and prior to U.S. EPA approval for start-up of the groundwater extraction system ("Date of Acceptance") Settling Defendants shall sample the designated

groundwater monitor wells (see Figure 9) on a semi-annual basis to monitor the plume. Required field analyses and laboratory analyses are identified in Section II.G.4, below.

After the Date of Acceptance by EPA of the groundwater extraction system, Settling Defendants shall sample each monitor well on a quarterly basis for the first two years of operation of the groundwater extraction system. Settling Defendants shall sample the monitor wells semi-annually for three to five years after the Date of Acceptance, and annually thereafter. Required field and laboratory analyses are identified in Section II.G.4, below. Monitor wells shall be sampled for at least 30 years. Monitoring results shall be used to show compliance or noncompliance with applicable or relevant and appropriate requirements ("ARARs"), whether additional groundwater Cleanup Standards are required, and to demonstrate the effectiveness of the groundwater extraction system at capturing and drawing back the plume.

EPA, in consultation with MDNR, shall determine the need for additional groundwater monitoring 30 years after the commencement of monitoring. This determination shall be based upon whether ARARs have been met and whether additional groundwater work shall be required to reach groundwater Cleanup Standards (see Table 1).

(b) Surface water and sediments

Settling Defendants shall sample surface water and sediments on an annual basis. Monitoring results shall be used to demonstrate compliance or noncompliance with ARARs and to demonstrate that protection of human health and the environment is being maintained until the PCB excavation program is completed (see Section II.D, above) and the source containment system and cap are installed (see Sections II.A and II.B).

4. Analyses

(a) Groundwater

Settling Defendants shall perform field analyses, including, at a minimum, groundwater elevation, pH, temperature, and specific conductivity, and laboratory analyses for the compounds presented in Table 1 of this SOW. If additional information (see Section II.G.5, below) indicates that the groundwater sampling program is not monitoring the entire contaminant plume or that there are additional chemical parameters of concern to EPA, then EPA, in consultation with MDNR, may require that additional groundwater monitor wells or sampling parameters be added to the regular sampling program.

(b) Surface water and sediments

Settling Defendants shall perform laboratory analyses for the compounds listed in Table 1, as well as for PCBs.

5. Additional Information

Additional information shall be gathered by Settling Defendants by implementing a full Hazardous Substance List analysis program, as approved by EPA in the QAPP, once every five years. If additional compounds are found to be above SDWA Maximum Contaminant Levels (MCLs), non-zero Maximum Contaminant Level Goals (MCLGs), or cleanup standards derived under Michigan Act 307, Type B criteria, those compounds shall be added to Table 1 as groundwater Cleanup Standards. The Cleanup Standard will be the more stringent of the MCLs or that cleanup standard derived under Michigan Act 307, Type B criteria as determined by EPA, in consultation with MDNR. If a compound not listed in Table 1 exceeds a lifetime carcinogenic risk of 1×10^{-6} or a hazard index value of 1.0, calculated under standard risk assessment assumptions as set forth in Sections II.E.2.a and II.E.2.b of the SOW, then the compound shall be added to Table 1. The groundwater Cleanup Standard established for such compound shall be at the level which represents a 1×10^{-6} risk or a 1.0 hazard index value, provided that the groundwater Cleanup Standard exceeds the natural background concentration of the contaminant. If the naturally occurring background level for the compound not listed in Table 1 is higher than the 1×10^{-6} risk level or 1.0 hazard index level, the background level will be the Cleanup Standard.

H. Air Monitoring

Settling Defendants shall perform air emission monitoring of treatment systems and assure that air toxics criteria are met, in accordance with the Clean Air Act (40 C.F.R. Parts 50 and 52) and Michigan Act 348. Treatment systems include the groundwater treatment system and the cap gas-venting system. EPA may determine, under the substantive requirements of an air permit under Michigan Act 348, that Settling Defendants must monitor, collect, and treat the air stripper air emissions. If EPA, in consultation with MDNR, requires treatment, Settling Defendants shall design a treatment system that complies with Michigan Act 348 and submit the design to EPA and MDNR. If EPA, after consultation with MDNR, disapproves of the design, Settling Defendants shall resubmit the design 30 days after receipt of comments. Settling Defendants shall implement the design upon EPA approval.

J. Disposal of Groundwater Treatment Sludges

In accordance with 40 C.F.R. Part 268, Settling Defendants shall test (TCLP test) metal sludges produced during the water treatment

process to determine whether they are RCRA characteristic wastes. If any sludge is RCRA characteristic, Settling Defendants shall treat that sludge, in accordance with the requirements of the Land Disposal Restrictions as set forth in 40 C.F.R. Part 268, prior to disposal in a RCRA-permitted facility.

K. Wetlands

Settling Defendants shall design and implement a wetlands replacement program to account for all wetland resources lost or adversely affected by the Site remediation. Figure 11 designates the affected wetlands area which shall be capped and thereby lost or adversely affected by the remediation.

Settling Defendants shall submit the design for the wetlands replacement program to EPA for review and approval, in consultation with MDNR.

L. Municipal Water Supply

Settling Defendants shall attach the residences and businesses designated in Figure 12, and from whom Settling Defendants have obtained consent, to the local municipal water supply within 12 months after the lodging of the Consent Decree. Settling Defendants shall then properly abandon the private drinking water wells in accordance with State law.

M. Technology Review

The ROD determined that current technologies would not be practicable to treat the principal threat posed by the Phase I landfill area. Settling Defendants shall institute a technology review, concurrent with each of the 5-year reviews undertaken by EPA pursuant to Section VIII ("Periodic Review") of the Consent Decree, to evaluate the effectiveness of emerging in situ treatment technologies in treating the Phase I landfill area contaminants and/or the threat in the Phase II and Phase III landfill areas of the Site. Settling Defendants shall submit the results of their review to EPA and MDNR within three months of the completion of each EPA 5-year review. The evaluation will seek to determine whether any such technologies would effectively decrease the levels of contamination within the containment system so as to (1) reduce the long-term risks associated with the contaminants, (2) reduce the risk of failure of the containment remedy due to the high concentrations of contaminants, and/or (3) reduce the risk of exposure to contaminants due to a failure of the containment system.

EPA, in consultation with MDNR, shall then determine whether a technology is sufficiently developed (e.g., in situ bioremediation) to treat in an effective, safe, and cost-effective manner the

principal threat in the Phase I landfill area and/or the threat in the Phase II and Phase III landfill areas.

N. Institutional Controls

Settling Defendants' actions shall be consistent with all institutional controls, including deed restrictions, imposed on the property occupied by the Site, including any institutional controls agreed to by the G&H Landfill property owner, the Estate of Leonard Forster.

Settling Defendants shall use best efforts to timely attain all additional deed restrictions, easements, land-use limitations, or other enforceable instruments restricting private property use that may be necessary to prevent interference with, and completion of, the Work to be performed on the Site under the Consent Decree. Settling Defendants shall file each additional instrument executed pursuant to this paragraph within five (5) business days of its execution.

III. SCOPE

The RD/RA shall consist of five tasks:

Task 1: RD/RA Work Plan

- A. RD Work Plan
- B. RD/RA Work Plan

Task 2: Remedial Design

- A. Design Plans and Specifications
- B. Cost Estimate
- C. Project Schedule
- D. Construction Quality Assurance Objectives
- E. Health and Safety Plan
- F. Operation and Maintenance Plan
- G. Design Phases
- H. Community Relations Support

Task 3: Remedial Action Construction

- A. Responsibility and Authority
- B. Construction Quality Assurance Personnel Qualifications
- C. Inspection Activities
- D. Sampling Requirements
- E. Documentation
- F. Community Relations Support

Task 4: Operation and Maintenance Implementation

Task 5: Reports

- A. Progress
- B. Draft
- C. Final

Task 1: RD/RA WORK PLAN

A. RD Work Plan. Settling Defendants shall prepare and submit to EPA for approval, in consultation with MDNR, and in accordance with the Submission Schedule set forth below, an RD Work Plan which describes the overall management strategy for the design phase of the remedial action. Plans and schedules for groundwater treatability testing, slurry wall compatibility testing, plans and schedule for PCB soil/sediment investigation, and remedy implementation shall be included in the RD Work Plan. The draft RD Work Plan is due 60 days after lodging of the Consent Decree. The final RD Work Plan is due 45 days after Settling Defendants receive EPA comments on the draft RD Work Plan. The RD Work Plan shall also include a description of the responsibility, authority and qualifications of key personnel directing the RD, including contractor personnel.

B. RD/RA Work Plan. Settling Defendants shall prepare and submit to EPA for approval, in consultation with MDNR and in accordance with the Submission Schedule set forth below, a draft RD/RA Work Plan. The RD portion of the RD/RA Work Plan is described above. The RA portion of the RD/RA Work Plan shall describe the overall management strategy for performing the construction, operation and maintenance, and monitoring of the remedial action. To the extent known, the RD/RA Work Plan shall also describe the responsibility, authority, and qualifications of all organizations and key personnel involved with the implementation of the Work required under the Consent Decree and this SOW.

Task 2: REMEDIAL DESIGN

Settling Defendants shall prepare and submit to EPA for approval, in consultation with MDNR, and in accordance with the Submission Schedule set forth below, preliminary, intermediate, prefinal, and final construction plans and specifications to implement the remedial action at the Site.

A. Design Plans and Specifications

Settling Defendants shall develop clear and comprehensive design plans and specifications which include, but are not limited to, the following:

1. Discussion of the design strategy and the design basis, including:
 - a. Compliance with all applicable and relevant and appropriate environmental and public health standards; and
 - b. Minimization of adverse environmental and public impacts.
2. Discussion of the technical factors of importance including:
 - a. Use of currently accepted environmental control measures and technology;
 - b. The constructability of the design; and
 - c. Use of currently acceptable construction practices and techniques.
3. Description of assumptions made and detailed justification of these assumptions.
4. Discussion of the possible sources of error, including references in the Operation and Maintenance Plan to possible operation and maintenance problems.
5. Detailed drawings of the proposed design including:
 - a. Qualitative flow sheets; and
 - b. Quantitative flow sheets.
6. Tables listing equipment and specifications.
7. Tables giving material and energy balances.
8. Appendices including:
 - a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);
 - b. Derivation of equations essential to understanding the report;
 - c. Groundwater treatability study and pump test work plans; and
 - d. Results of laboratory and field tests.

B. Cost Estimate

Settling Defendants shall develop cost estimates to construct and implement the remedial action. The cost estimate developed in the FS shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and, in the Operation and Maintenance Plan, the operation and maintenance costs. Should EPA determine that it must assume the RD/RA responsibility, Settling Defendants, upon request, shall provide the most recent cost estimates to EPA.

C. Project Schedule

Upon EPA approval of the RD/RA Work Plan, Settling Defendants shall develop an expedited Project Schedule for construction and implementation of the remedial action which identifies the dates for initiation and completion of all critical path tasks. An Initial Project Schedule shall be submitted simultaneously with the Prefinal Design Document submission and the Final Project Schedule with the Final Design Document. The Final Project Schedule is subject to review and approval by EPA, in consultation with MDNR.

D. Construction Quality Assurance Objectives

Settling Defendants shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to, the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation.

E. Health and Safety Plan

Settling Defendants shall develop a Health and Safety (H&S) Plan to address the activities to be performed at the Site to implement the remedial action. The H&S Plan shall be submitted to EPA and MDNR for review.

F. Operation and Maintenance Plan

Settling Defendants shall prepare an Operation and Maintenance Plan to provide for the long-term maintenance of the remedial action. The plan shall be composed of the following elements:

1. Description of normal operation and maintenance (O&M):
 - a. Description of tasks for operation;
 - b. Description of tasks for maintenance;
 - c. Description of prescribed treatment or operation conditions; and

- d. Schedule showing frequency of each O&M task.
- 2. Description of potential operating problems:
 - a. Description and analysis of potential operation problems;
 - b. Sources of information regarding problems; and
 - c. Common and/or anticipated remedies.
- 3. Description of routine monitoring and laboratory testing:
 - a. Description of monitoring tasks;
 - b. Description of required laboratory tests and their interpretation;
 - c. Required data collection, Quality Assurance Project Plan (QAPP);
 - d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease; and
 - e. Description of triggering mechanisms for groundwater/surface water monitoring results.
- 4. Description of alternate O&M:
 - a. Should systems fail, alternate procedures to prevent releases or threatened releases to protect public health and the environment; and
 - b. Analysis of vulnerability and additional resource requirements should a failure occur.
- 5. Corrective Action:
 - a. Description of corrective action to be implemented in the event that groundwater Cleanup Standards are exceeded in the leading edge of the groundwater contaminant plume or NPDES criteria for discharges to surface waters or DWSD pretreatment criteria, if applicable, are exceeded;
 - b. Description of corrective action to be implemented in the event that the cap has sustained any form of damage, including, but not limited to, cracking, penetration, and erosion;
 - c. Description of corrective action to be implemented in the event that air stripper and/or landfill gas emission levels are exceeded; and

- d. Schedule for implementing these corrective actions.
- 6. Safety plan:
 - a. Description of standard safety practices for site personnel, including, without limitation, precautions and necessary safety equipment; and
 - b. Safety tasks required in event of systems failure.
- 7. Description of equipment:
 - a. Equipment identification;
 - b. Installation of monitoring components;
 - c. Maintenance of Site equipment; and
 - d. Replacement schedule for equipment and installed components.
- 8. Records and reporting mechanisms required:
 - a. Operating logs;
 - b. Laboratory records;
 - c. Records for operating costs upon takeover;
 - d. Mechanism for reporting emergencies;
 - e. Personnel and maintenance records; and
 - f. Monthly/annual reports to EPA and MDNR.

A draft Operation and Maintenance Plan shall be submitted simultaneously with the Final Design Document and the Final Operation and Maintenance Plan shall be submitted upon completion of construction.

G. Design Phases

The design of the remedial action shall include the phases outlined below.

1. Preliminary design

Settling Defendants shall submit the preliminary design when the design effort is approximately 30% complete. At this stage, Settling Defendants shall have field verified the existing conditions of the Site. The preliminary design shall reflect a level of effort such that the technical requirements of the project

have been addressed and outlined so that they may be reviewed to determine if the final design will provide an operable and usable remedial action. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the remedial action. The preliminary construction drawings by Settling Defendants shall reflect organization and clarity. The scope of the technical specifications shall be outlined in a manner reflecting the final specifications. Settling Defendants shall include design calculations with their preliminary submission, reflecting the same percentage of completion as the designs they support.

2. Correlating plans and specifications

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, Settling Defendants shall:

- a. Coordinate and cross-check the specifications and drawings; and
- b. Complete the proofing of the edited specifications and the cross-checking of all drawings and specifications.

These activities shall be completed prior to the 95% prefinal design submittal to EPA (see Section III.F.6, below).

3. Equipment start-up and operator training

Settling Defendants shall prepare, and include in the technical specifications governing groundwater treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

4. Additional studies

EPA, in consultation with MDNR, may require additional studies to supplement the available technical data required to implement the ROD and this SOW. Additional studies may be required for any modification, enhancement, or addition to the remedial design for the remedial action to be performed. Settling Defendants shall complete any additional studies needed and shall furnish all necessary equipment and personnel to do so.

5. Intermediate Design

EPA may require a design review at 60% completion of the project. If required, Settling Defendants' intermediate design submittal

shall include the same elements as the prefinal design, discussed in Section III.F.6, below.

6. Prefinal and Final Design

Settling Defendants shall submit the prefinal/final design documents in two parts. The prefinal design shall be at 95% completion of design. After approval of the prefinal submission, Settling Defendants shall execute the required revisions and submit the complete final documents with reproducible drawings and specifications.

The prefinal design submittal shall consist of the design Plans and Specifications, draft Operation and Maintenance Plan, Project Schedule, draft Groundwater Treatability Study Work Plan, Quality Assurance Project Plan and Specifications for the Health and Safety Plan. In the event of any EPA project takeover request, Settling Defendants shall submit a capital and operating and maintenance cost estimate to EPA.

The final design submittal shall consist of the Final Design Plans and Specifications (100% complete), the Final Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule, Final Groundwater Treatability Study Work Plan, and Final Health and Safety Plan specifications. The quality of the design documents shall be such that Settling Defendants would be able to include them in a bid package and invite contractors to submit bids for the construction project. In the event of any EPA project takeover request, Settling Defendants shall submit a capital and operating and maintenance cost estimate to EPA.

H. Community Relations Support

A community relations program will be implemented by EPA in consultation with MDNR. Settling Defendants shall cooperate with the EPA and MDNR by participating in the preparation of all appropriate information disseminated to the public and in public meetings that may be held or sponsored by EPA or MDNR to explain activities at or concerning the Site.

Community relations support will be consistent with Superfund community relations policy as stated in the "Guidance for Implementing the Superfund Program" and Community Relations in Superfund - A Handbook.

TASK 3: REMEDIAL ACTION CONSTRUCTION

Following EPA approval, in consultation with MDNR, of the final design, Settling Defendants shall develop and implement a construction quality assurance (CQA) program to ensure, with a reasonable degree of certainty, that the completed remedial action will meet or exceed all design criteria, plans and specifications.

The CQA plan is a Site-specific document which must be submitted to EPA, in consultation with MDNR, for approval prior to the start of the construction. At a minimum, the CQA plan should include the elements which are summarized below. Upon EPA approval of the CQA plan, Settling Defendants shall construct and implement the remedial action in accordance with the approved design schedule and the CQA plan.

A. Responsibility and Authority

Settling Defendants shall fully describe the responsibility and authority of all organizations (e.g., technical consultants, construction firms) and key personnel involved in the construction of the remedial action in the CQA plan. Settling Defendants shall also identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the remedial action shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with applicable or relevant and appropriate requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records (e.g., RCRA transportation manifests). The inspection shall also ensure compliance with all health and safety procedures. In addition to oversight inspections, Settling Defendants shall conduct the following activities.

1. Preconstruction inspection and meeting

Settling Defendants shall conduct a preconstruction inspection and meeting with representatives of EPA and MDNR to:

- a. Review methods for documenting and reporting inspection data;
- b. Review methods for distributing and storing documents and reports;
- c. Review work area security and safety protocol;

- d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and
- e. Conduct a facility walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes shall be transmitted to all parties.

2. Prefinal inspection

Upon preliminary project completion, Settling Defendants shall notify EPA and MDNR for the purposes of conducting a prefinal inspection. The prefinal inspection shall consist of a walk-through inspection of the entire project at the Site. The inspection is to determine whether the project is complete and consistent with the contract documents and the EPA-approved remedial action(s). Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment shall be operationally tested by Settling Defendants. Settling Defendants shall certify that the equipment has performed to meet the purpose and intent of the specifications. Re-testing will be completed where deficiencies are revealed. The prefinal inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and the date for the final inspection.

3. Final inspection

Upon completion of any outstanding construction items, Settling Defendants shall notify EPA and MDNR for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the entire project at the Site. The prefinal inspection report will be used as a checklist with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Settling Defendants shall confirm that outstanding items have been resolved.

D. Sampling Requirements

Settling Defendants shall present sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems as addressed in the project specifications in the CQA plan.

E. Documentation

Reporting requirements for CQA activities shall be described in detail in the CQA plan. This shall include such items as daily

summary reports, inspection data sheets, problem identification and corrective measure reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

F. Community Relations Support

During remedial action construction, community relations support shall proceed as described in Section II, Task 2.G above.

TASK 4: Operation and Maintenance Implementation

As each component of the remedial action has been approved by EPA, in consultation with MDNR, Settling Defendants shall implement the respective portion(s) of the Operation and Maintenance Plan.

TASK 5: Reports and Submissions

Settling Defendants shall prepare plans, specifications, and reports as set forth in Tasks 1 through 4 to document the design, construction, operation, maintenance, and monitoring of the Work. The documentation shall include, but not be limited to the following:

A. Progress Reports

Settling Defendants shall, at a minimum, provide EPA and MDNR with signed monthly progress reports during the design and construction phases and quarterly progress reports, at a minimum, for operation and maintenance activities containing:

1. A description and estimate of the percentage of the RD/RA completed;
2. Summaries of all findings;
3. Summaries of all changes made in the RD/RA during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period, including qualifications;
8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory and monitoring data.

Any changes in personnel during the reporting period shall be subject to review and approval by EPA, in consultation with MDNR.

B. Draft Submittals

1. Settling Defendants shall submit draft RD and RD/RA Work Plans as outlined in Task 1, above;
2. Settling Defendants shall submit draft Construction Plans and Specifications, Design Reports, Schedules, and Study Reports as outlined in Task 2, above. In the event of an EPA project takeover request, the Settling Defendants shall submit an estimate of the capital cost and cost of the operation and maintenance to be performed at the Site;
3. Settling Defendants shall submit a draft construction Quality Assurance Program Plan and Documentation as outlined in Task 3, above;
4. Settling Defendants shall submit a draft Operation and Maintenance Plan as outlined in Task 2, above; and
5. Settling Defendants shall submit a draft Remedial Action Implementation Report at the completion of the project construction. The Report shall document that the project is consistent with the design specifications, and that the remedial action is performing adequately. The Report shall include, but not be limited to, the following elements:
 - a. Synopsis of the remedial action and certification by Settling Defendants that the remedial action is constructed as required in the final design;
 - b. Explanation of any modifications to the plans and why these were necessary for the project. Any modifications shall be approved by EPA, in consultation with MDNR;
 - c. Listing of the criteria, established before initiation of the remedial action, for judging the functioning of the remedial action and also explaining any modification to these criteria;
 - d. A demonstration that each component of the remedial action, including, without limitation, the cap and the groundwater treatment system, meets and/or will meet the applicable Performance Standards. Such demonstration, at a minimum, shall consist of:

- i) a summary of soil testing results from the landfill cap and slurry wall construction, collected in accordance with the Construction Quality Assurance Project Plan;
 - ii) water level measurements and pumping records that show groundwater capture is being achieved by the groundwater extraction system pursuant to Section II.E of the SOW;
 - iii) water level measurements and pumping records that show the hydraulic gradient is being maintained across the slurry wall or trench and FML;
 - iv) water quality analysis results from the groundwater treatment plant which demonstrates compliance with the discharge criteria under Section II.E.3 and 4 of the SOW; and
 - v) air quality analysis results upwind and downwind of the landfill demonstrating compliance with air toxics criteria established pursuant to Section II.H of the SOW.
- e. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Site; and
 - f. Data demonstrating that the soil cleanup in the area south of the landfill and in the Junkyard has been completed pursuant to Section II.C, D, and G of the SOW and that the remedial action has been, and is being, implemented as designed.

C. Final Submittals

After EPA and MDNR review and comment on draft submissions, Settling Defendants shall finalize, for EPA approval, the RD/RA Work Plans, Design Reports, Construction Plans and Specifications, Cost Estimates upon takeover request, Project Schedule, Operation and Maintenance Plan, Study Reports, Construction Quality Assurance Program Plan and Documentation, and the Remedial Action Implementation Report.

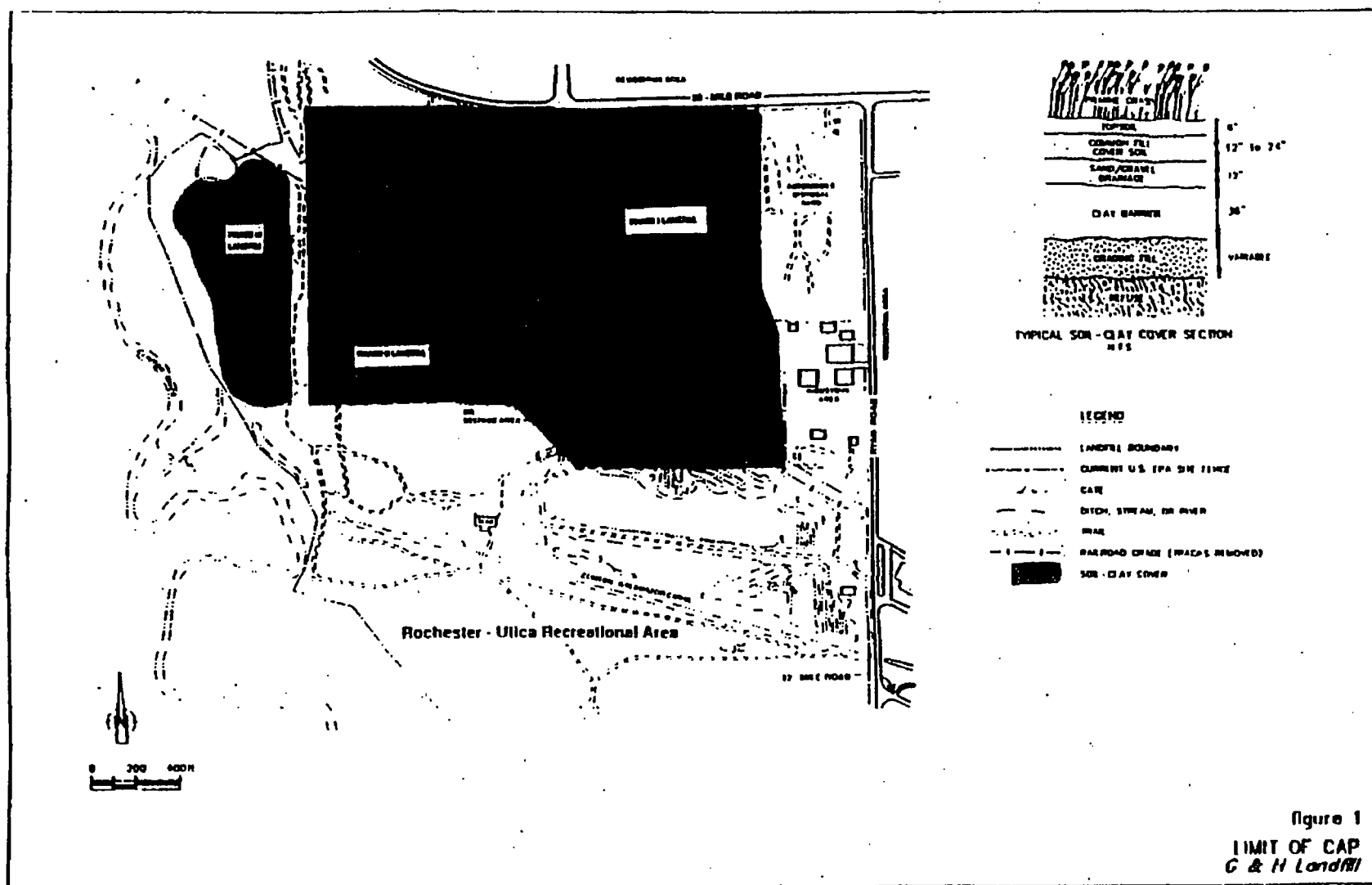
Submission Schedule

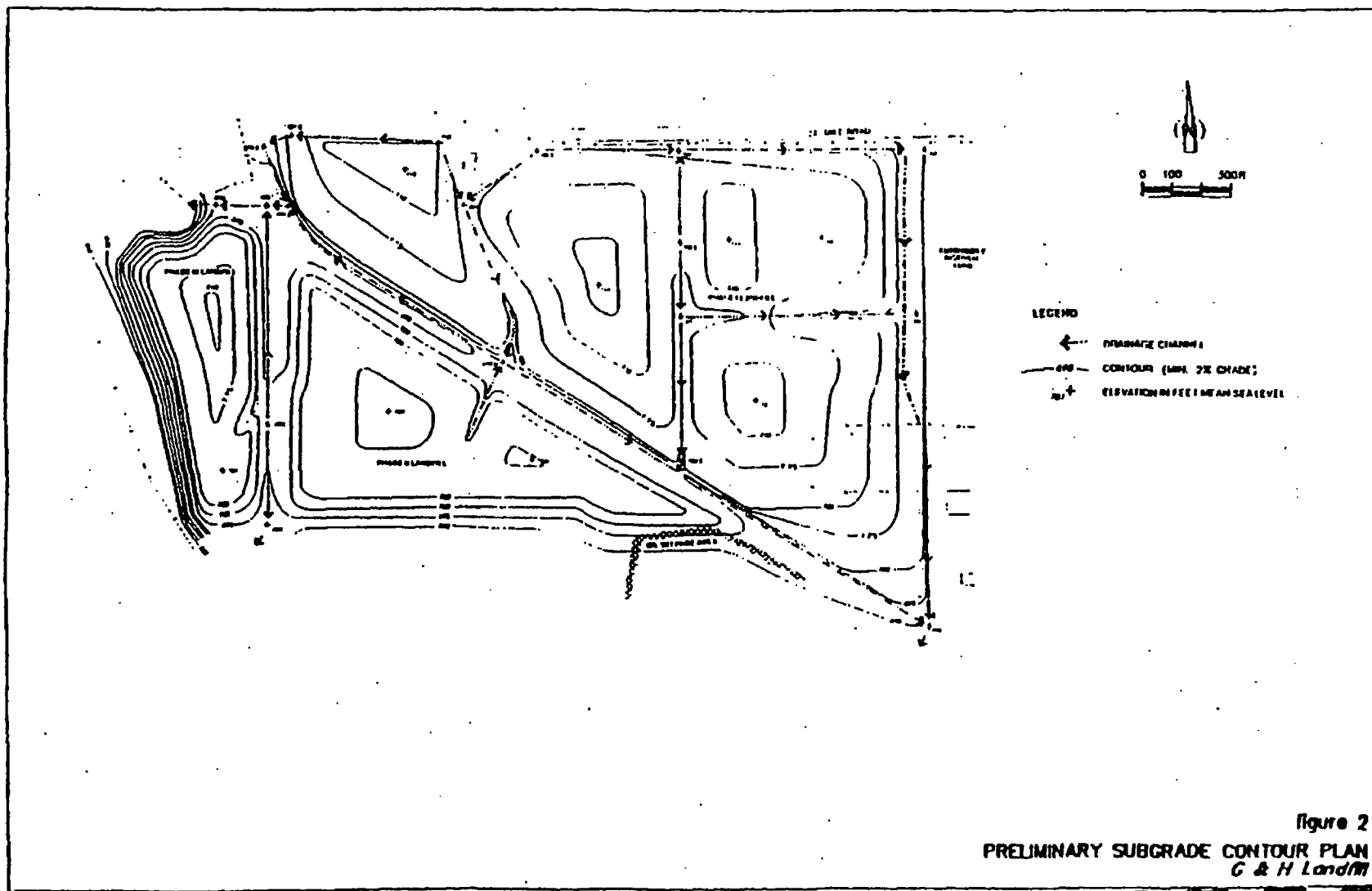
Settling Defendants' RD/RA Work Plan shall comply with the information reporting requirements presented below:

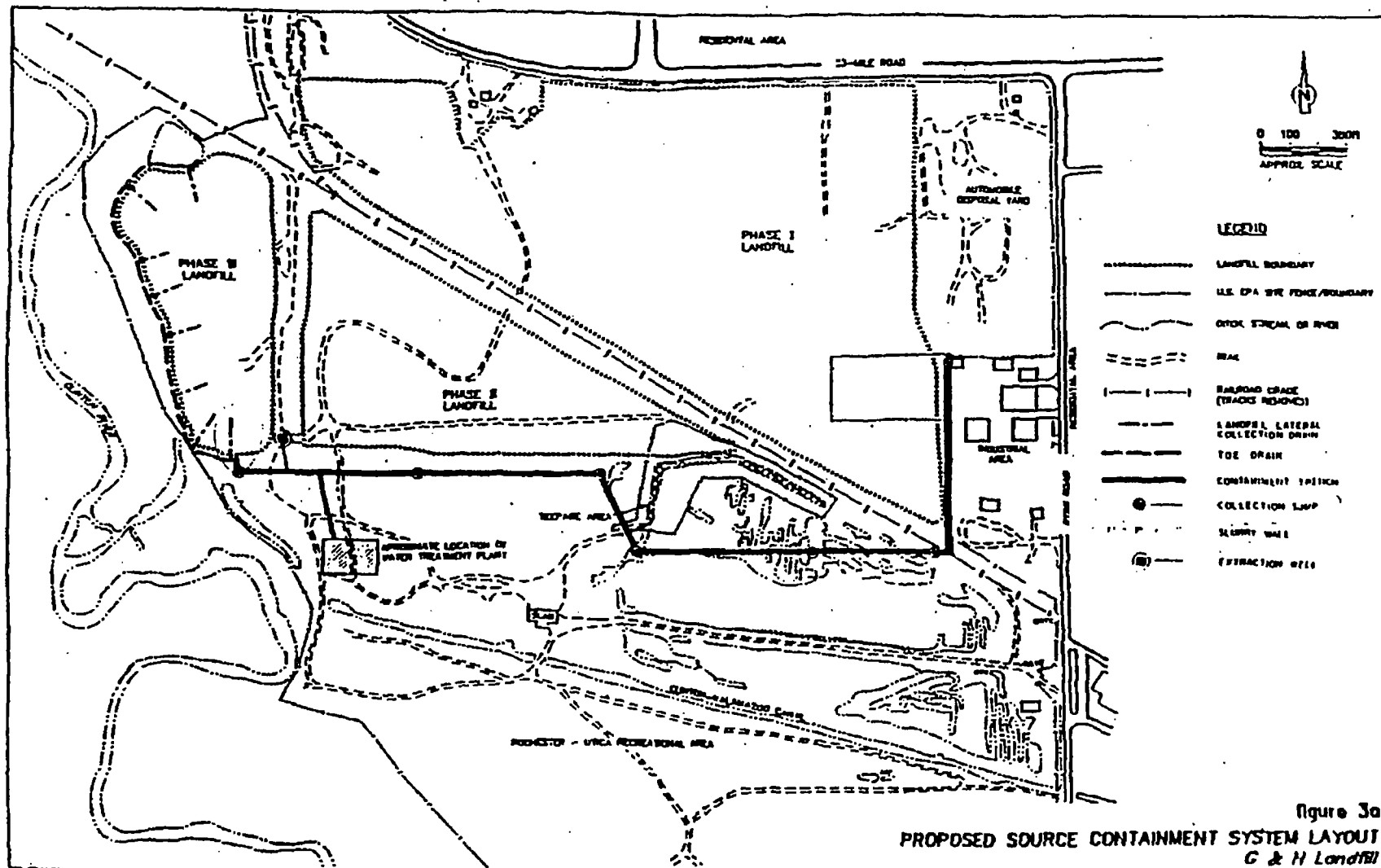
<u>Submission</u>	<u>Due Date</u>
Draft RD Work Plan (Task 1)	60 days after the lodging of the Consent Decree.

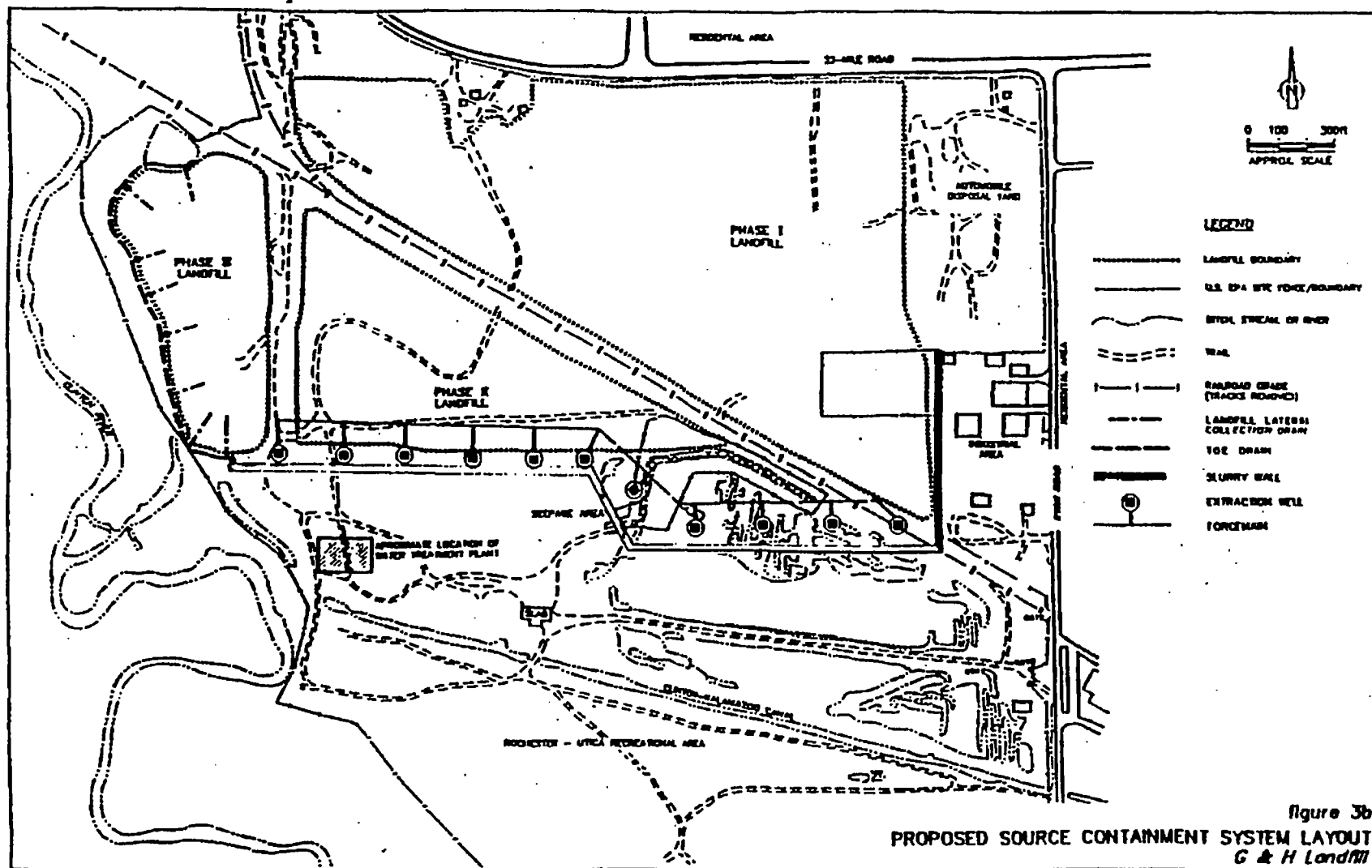
<u>Submission</u>	<u>Due Date</u>
Draft RD/RA Work Plan (Task 1)	60 days after entry of the Consent Decree.
Final RD Work Plan (Task 1)	45 days after EPA comments on draft RD Work Plan.
Final RD/RA Work Plan (Task 1)	30 days after EPA comments on draft RD/RA Work Plan.
Treatability Test Work Plan (Groundwater/Leachate)	As approved by EPA in the RD/RA Work Plan.
PCB Soil/Sediment Investigation	120 days after EPA approval of the RD/RA Work Plan.
Preliminary Design (30% completion)	
Groundwater, Cap, Source Containment System	120 days after EPA approval of the Final RD/RA Work Plan.
Intermediate Design (60% completion) (if required)	
Groundwater, Cap, Source Containment System	210 days after EPA approval of the RD/RA Work Plan.
Prefinal Design (95% completion)	
Groundwater, Cap, Source Containment System	60 days after EPA comments on Intermediate Design.
Final Design (100% completion)	60 days after EPA approval of the Prefinal Design.
Draft Submittals:	Concurrent with Prefinal Design.
Construction Designs and Specifications	
Design Reports	
Cost Estimates (Upon takeover request)	
Project Schedules	
Operation and Maintenance Plan (Task 2)	
Construction Quality Assurance Plan (Task 3)	

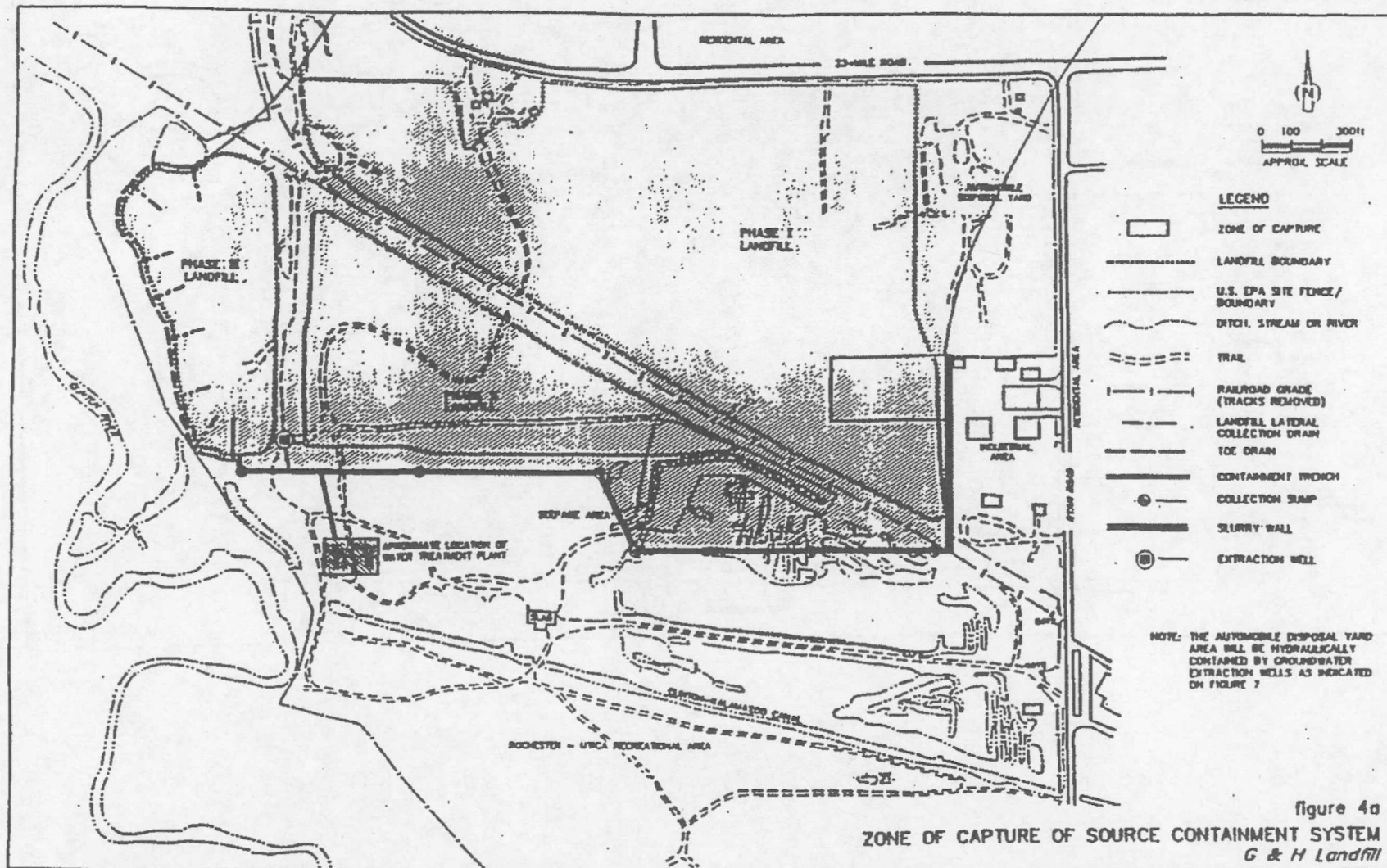
<u>Submission</u>	<u>Due Date</u>
Final Submittals:	Concurrent with Final Design.
Construction Designs and Specifications	
Design Reports	
Cost Estimates (Upon takeover request)	
Project Schedules	
Operation and Maintenance Plan (Task 2)	
Construction Quality Assurance Plan (Task 3)	
Construction of Remedial Action	As approved in Final Design.
Performance of Groundwater Treatability Test	As approved in Final Design
Prefinal Inspection Report	30 days after prefinal inspection.
Draft Remedial Action Report (Task 5)	Within 60 days of final inspection.
Completion of Construction	As approved by EPA in the RD/RA Work Plan.
Final Remedial Action Report (Task 5)	45 days after EPA comments on Draft RA Report.
Progress Reports for Tasks 1 through 3	Monthly
Progress Reports during Operation and Maintenance	Quarterly.

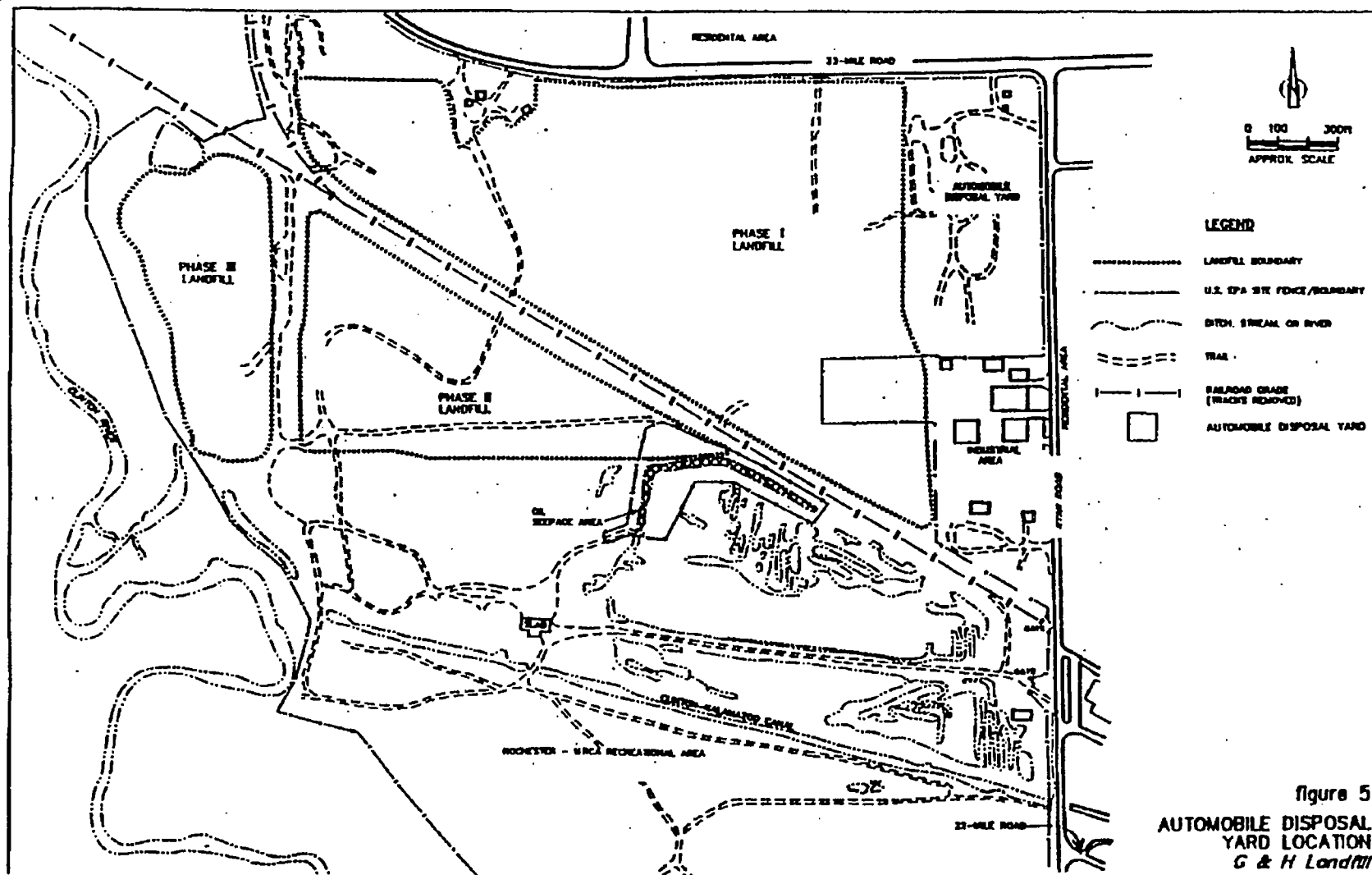












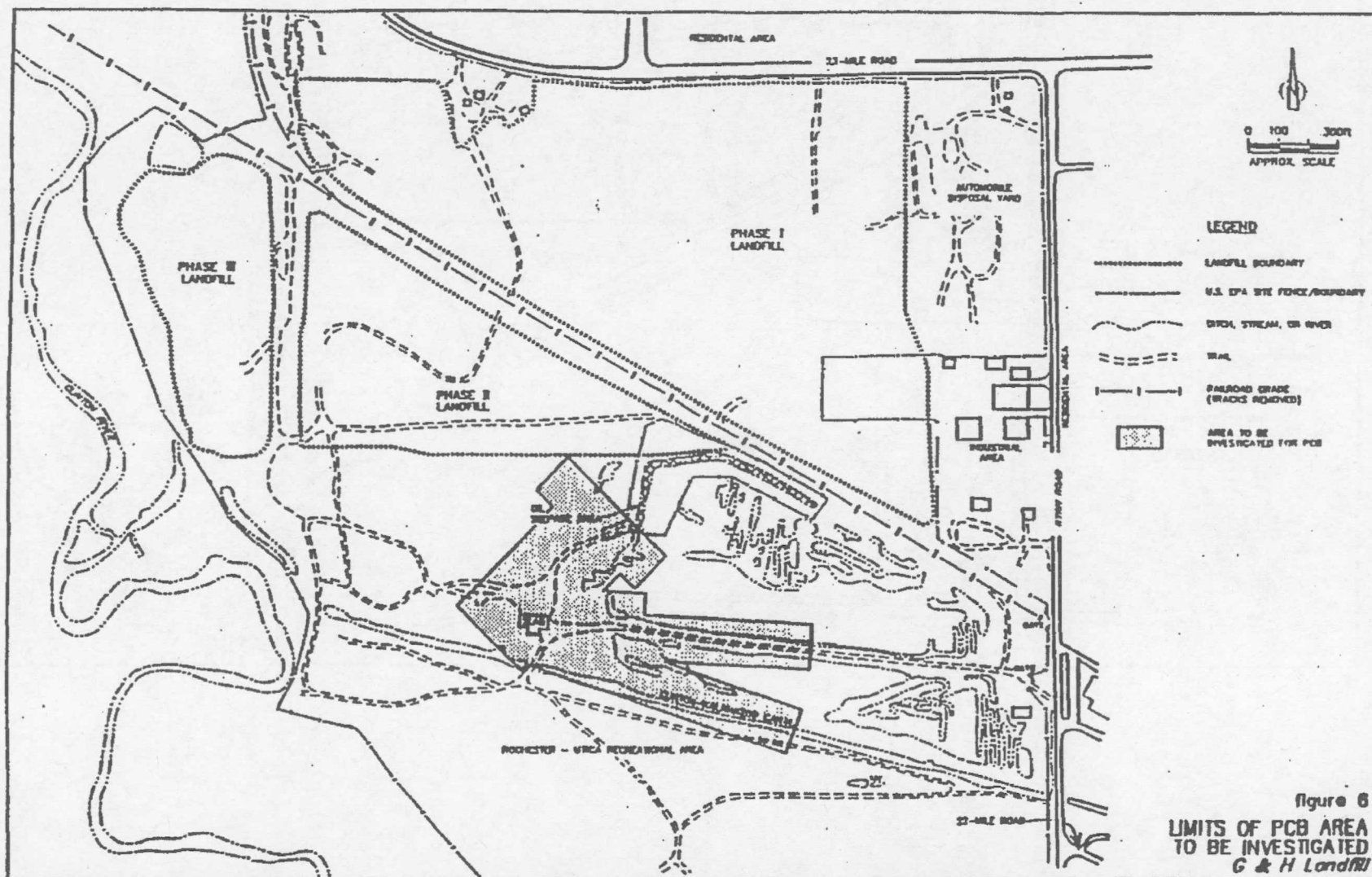
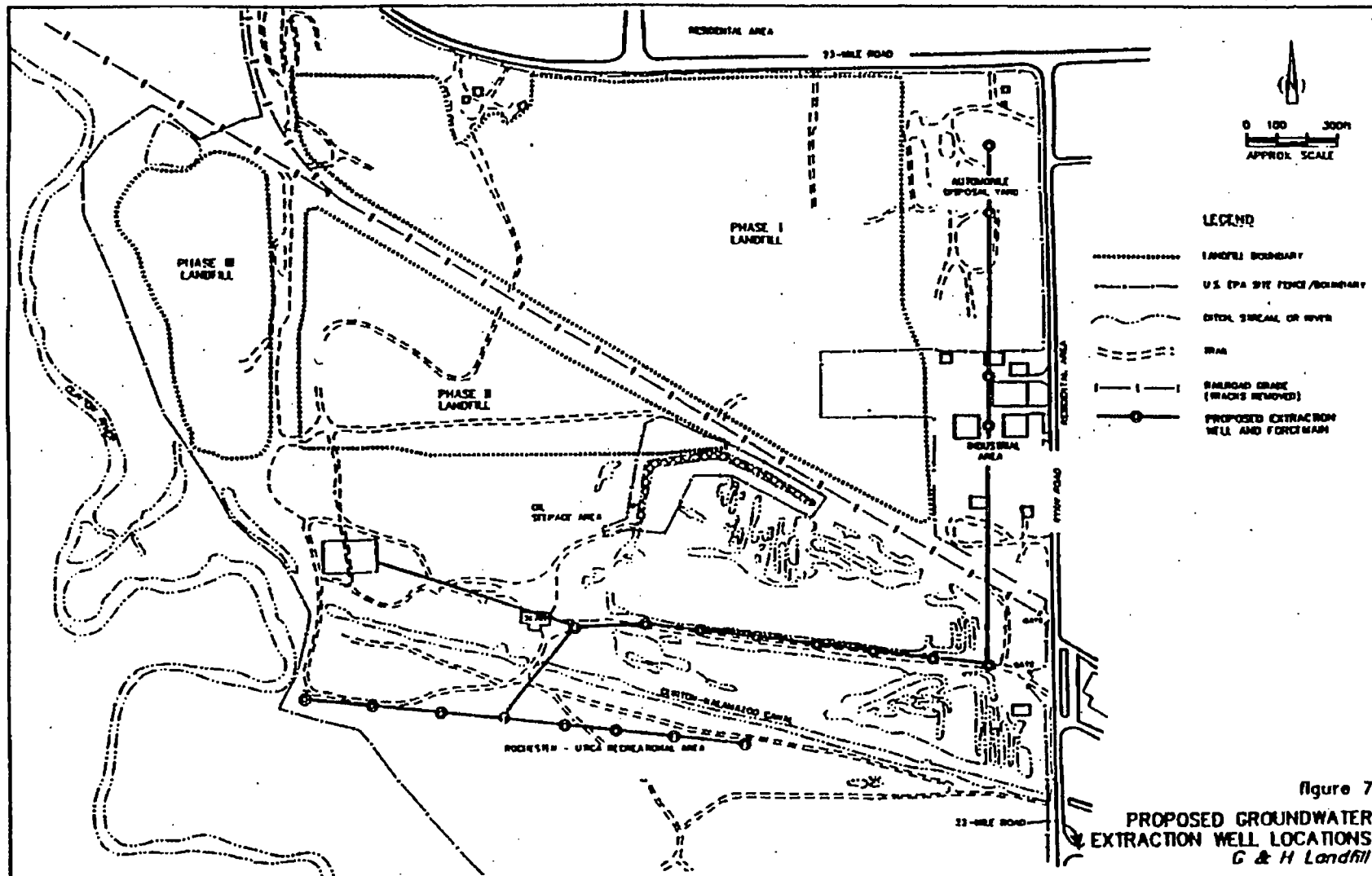


figure 6
LIMITS OF PCB AREA
TO BE INVESTIGATED
G & H Landfill



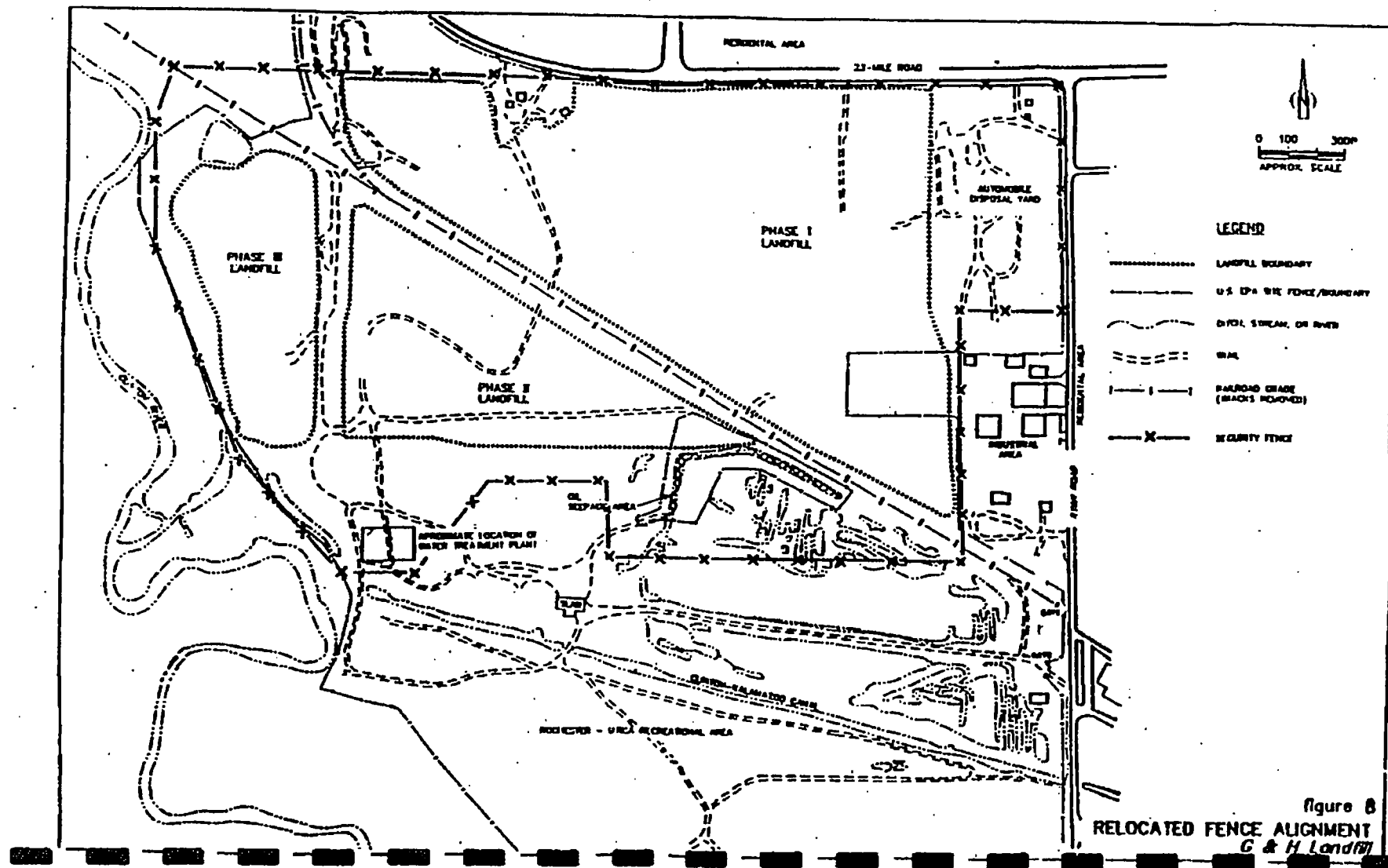


figure 8
RELOCATED FENCE ALIGNMENT
G & H Landfill

